Remarks begin on page 6.

## **Status of the Claims:**

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1. (Currently amended) A method of fabricating a <u>diffractive or non-dispersive</u> polymer dispersed liquid crystal electrooptic device, <del>wherein said device is either diffractive or non-dispersive</del>, comprising the steps of:

providing a nematic liquid crystal in the form of a eutectic mixture; providing a photo-curable pre-polymer mixture;

mixing said nematic liquid crystal with said photo-curable pre-polymer mixture to form a homogeneous nematic/pre-polymer mixture, with said nematic liquid crystal being greater than 40% (by weight) of said combined homogeneous mixture;

providing a cell comprising a pair of spaced apart transparent substrates that are each coated with a transparent conductive layer, without the inclusion of an alignment layer for aligning said nematic liquid crystal;

filling said cell with said homogeneous nematic/pre-polymer mixture; and photo-curing said nematic/pre-polymer mixture using a spatially inhomogeneous illumination source; and

utilizing the above fabrication method to create said diffractive or nondispersive thereby creating the electrooptic device in the form of a polymer dispersed liquid crystal (PDLC) exhibiting low scattering loss and high index modulation.

- 2. (Original) The method as defined in claim 1 wherein said nematic liquid crystal possesses a positive dielectric anisotropy.
- 3. (Canceled)
- 4. (Currently amended) The method as defined in claim 1 wherein said substrates are separated from about 5-6  $\mu$ m to about 8-20  $\mu$ m.

- 5. (Original) The method as defined in claim 1 wherein said PDLC is comprised of a dispersion of discrete droplets containing nematic liquid crystal-rich material in a polymerrich matrix.
- 6. (Original) The method as defined in claim 1 wherein said PDLC is comprised of regions of inter-connected spaces that are filled with nematic liquid crystal-rich material.
- 7. (Original) The method as defined in claim 1 further comprising the step of deriving said spatially inhomogeneous illumination source used to photo-cure the nematic/pre-polymer mixture from the interference of two coherent optical beams within said cell.
- 8. (Original) The method as defined in claim 7 wherein said coherent optical beams each have a wavelength in the ultraviolet spectrum.
- 9. (Original) The method as defined in claim 7 wherein said interfering optical beams are incident symmetrically about a direction normal to said cell in order to form said PDLC as an unslanted PDLC transmission grating.
- 10. (Original) The method as defined in claim 9 wherein said optical beams interfere at such an angle as to form said unslanted PDLC transmission grating with a grating period that is greater than half the wavelength of the light to be diffracted by the PDLC transmission grating during use of said transmission grating.
- 11. (Previously amended) The method as defined in claim 9 wherein said optical beams interfere at such an angle as to form said unslanted PDLC transmission grating with a spatial frequency that is sufficiently high to prohibit propagating diffracted orders for normal incident light, thereby creating an electrooptic retarder with electrically tunable birefringence.
- 12. (Original) The method as defined in claim 10 where said nematic liquid crystal in the nematic-rich regions in the PDLC contains a high degree of orientational order and has its nematic director substantially aligned along its grating vector when no drive field is applied across said cell.

- 13. (Previously amended) The method as defined in claim 6 where said nematic liquid crystal in the nematic-rich regions in the PDLC contains a high degree of orientational order and has its nematic director substantially aligned along its grating vector when no drive field is applied across said cell.
- 14. (Currently amended) A method of fabricating a <u>diffractive or non-dispersive</u> polymer dispersed liquid crystal static optical device, <del>wherein said device is either diffractive or non-dispersive</del>, comprising the steps of:

providing a nematic liquid crystal in the form of a eutectic mixture; providing a photo-curable pre-polymer mixture;

mixing said nematic liquid crystal with said photo-curable pre-polymer mixture to form a homogeneous nematic/pre-polymer mixture, with said nematic liquid crystal being greater than 40% (by weight) of said combined homogeneous mixture;

providing a cell comprising a pair of spaced apart transparent substrates, without the inclusion of an alignment layer for aligning said nematic liquid crystal; filling said cell with said homogeneous nematic/pre-polymer mixture; and photo-curing said nematic/pre-polymer mixture using a spatially

utilizing the above fabricating method to create said diffractive or nondispersive thereby creating the static optical device in the form of a polymer dispersed liquid

crystal (PDLC) exhibiting low scattering loss and high index modulation.

inhomogeneous illumination source; and

- 15. (Currently amended) The method as defined in claim 14 wherein said substrates are separated from about 5-6  $\mu$ m to about 8-20  $\mu$ m.
- 16. (Original) The method as defined in claim 14 wherein said PDLC is comprised of a dispersion of discrete droplets containing nematic liquid crystal-rich material in a polymerrich matrix.
- 17. (Original) The method as defined in claim 14 wherein said PDLC is comprised of regions of inter-connected spaces that are filled with nematic liquid crystal-rich material.

- 18. (Original) The method as defined in claim 14 further comprising the step of deriving said spatially inhomogeneous illumination source used to photo-cure the nematic/pre-polymer mixture from the interference of two coherent optical beams within said cell.
- 19. (Original) The method as defined in claim 18 wherein said coherent optical beams each have a wavelength in the ultraviolet spectrum.
- 20. (Original) The method as defined in claim 18 wherein said interfering optical beams are incident symmetrically about a direction normal to said cell in order to form said PDLC as an unslanted PDLC transmission grating.
- 21. (Original) The method as defined in claim 20 wherein said optical beams interfere at such an angle as to form said unslanted PDLC transmission grating with a grating period that is greater than half the wavelength of the light to be diffracted by the PDLC transmission grating during use of said transmission grating.
- 22. (Original) The method as defined in claim 20 wherein said optical beams interfere at such an angle as to form said unslanted PDLC transmission grating with a spatial frequency that is sufficiently high to prohibit propagating diffracted orders for normal incident light, thereby creating a retarder with electrically tunable birefringence.
- 23. (Previously amended) The method as defined in claim 17 where said nematic liquid crystal in the nematic-rich regions in the PDLC contains a high degree of orientational order and has its nematic director substantially aligned along its grating vector.
- 24. (Previously amended) The method as defined in claim 17 where said nematic liquid crystal in the nematic-rich regions in the PDLC contains a high degree of orientational order and has its nematic director substantially aligned along its grating vector.

## 25. (Canceled)